


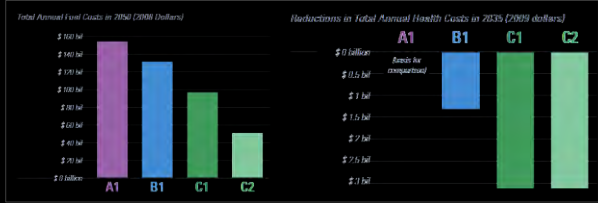
URBAN FOOTPRINT SCAG Scenario Planning Model Integration



Next Generation
Open Source
Sketch Model &
Data Ecosystem

12 June 2013

SCAG SPM External Working Group



Total Annual Fiscal Costs in 2035 (2009 dollars)

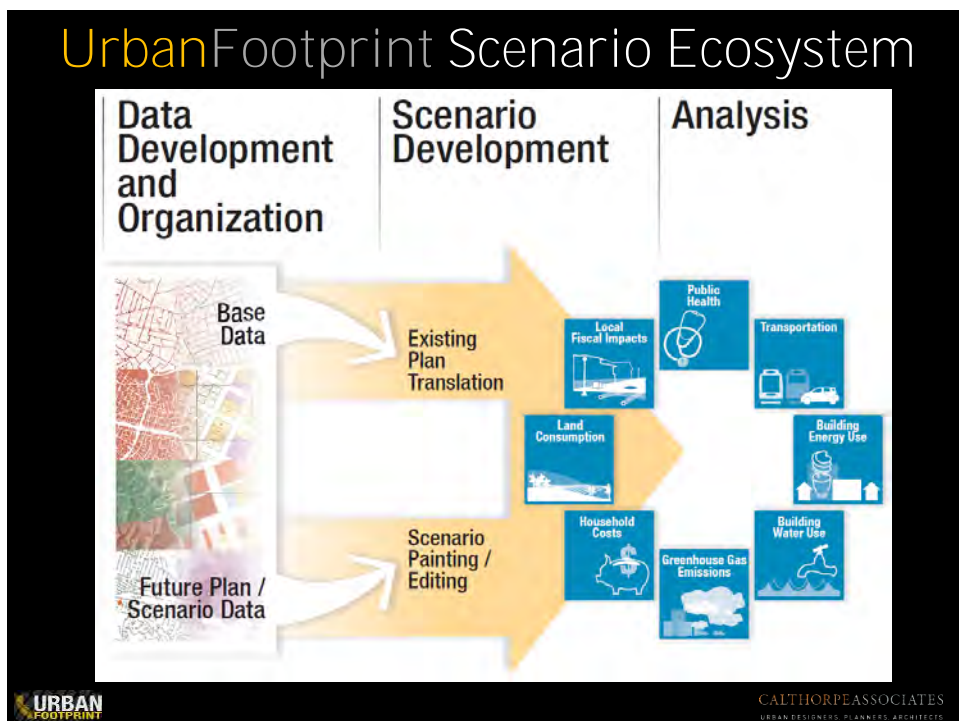
Scenario	Total Annual Fiscal Costs (2009 dollars)
A1	\$1,400 bil
B1	\$1,200 bil
C1	\$800 bil
C2	\$600 bil

Reductions in Total Annual Health Costs in 2035 (2009 dollars)

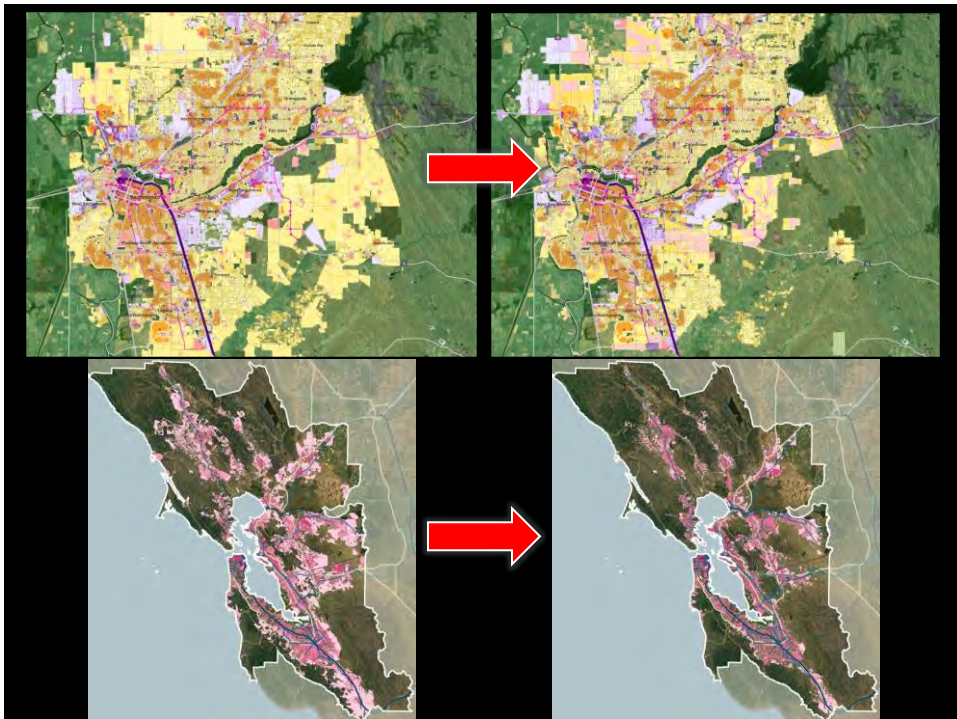
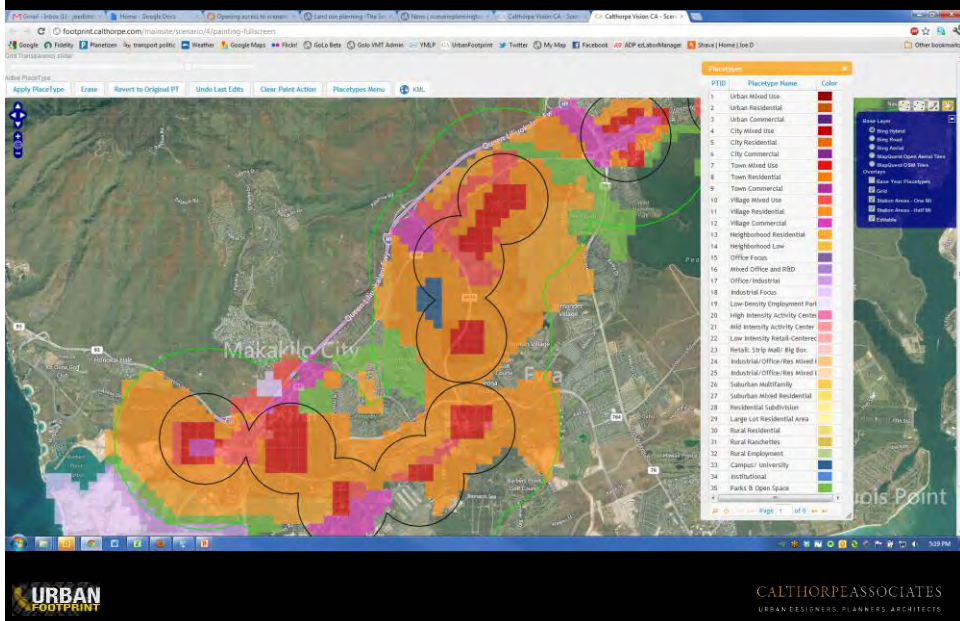
Scenario	Reductions in Total Annual Health Costs (2009 dollars)
A1	\$0.5 bil
B1	\$0.5 bil
C1	\$0.5 bil
C2	\$0.5 bil

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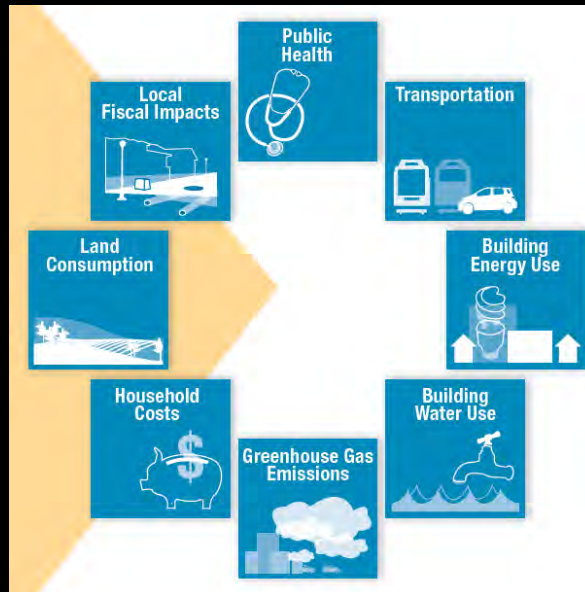
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Sketch Futures...



...Test Impacts



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Version 1.1 Open Source Software Stack



Mapping/Display
Polymaps
Mapnik
d3

Data Delivery & Queuing
Celery-Redis Queue
Tilestache

Database, Analysis, UI
SproutCore
Postgresql-PostGIS
Python - Django - Apache

Operating System
Ubuntu Linux



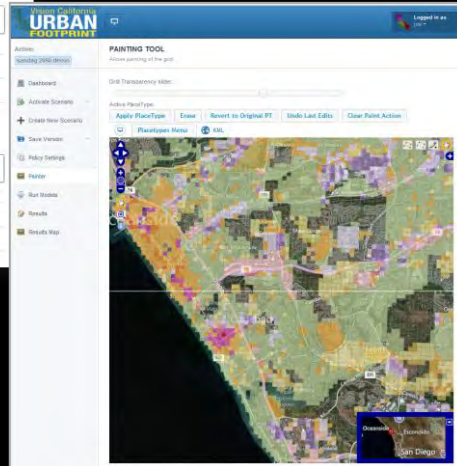
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'Thin Client' User Interface

Cloud-Based
Web Interface

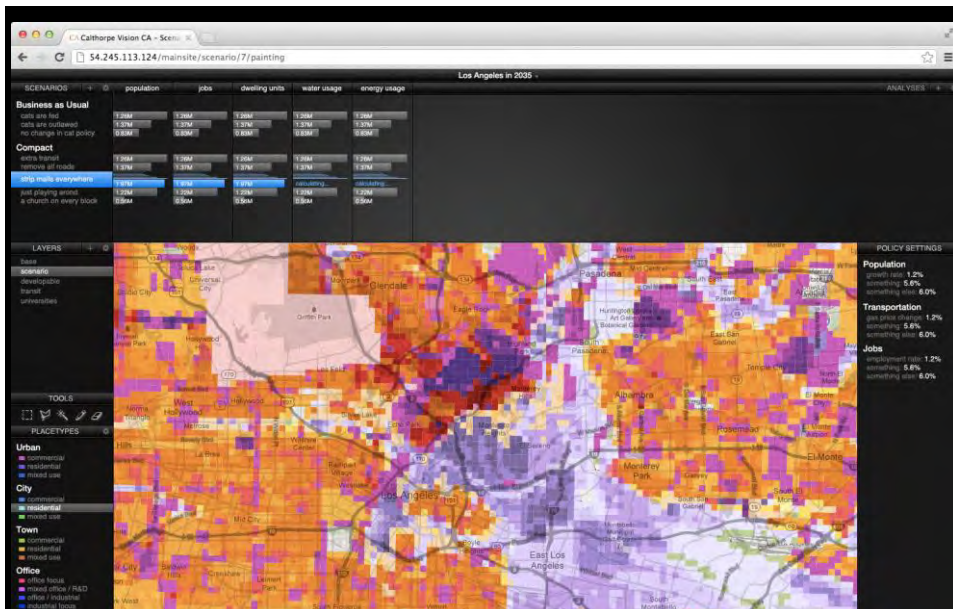


Desktop, Mobile, Tablet
Ready



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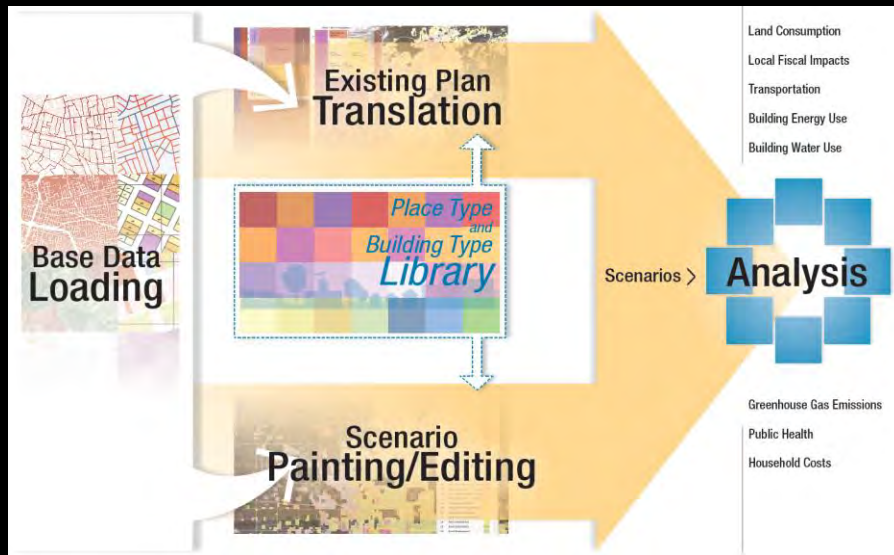


User Interface Enhancements Underway

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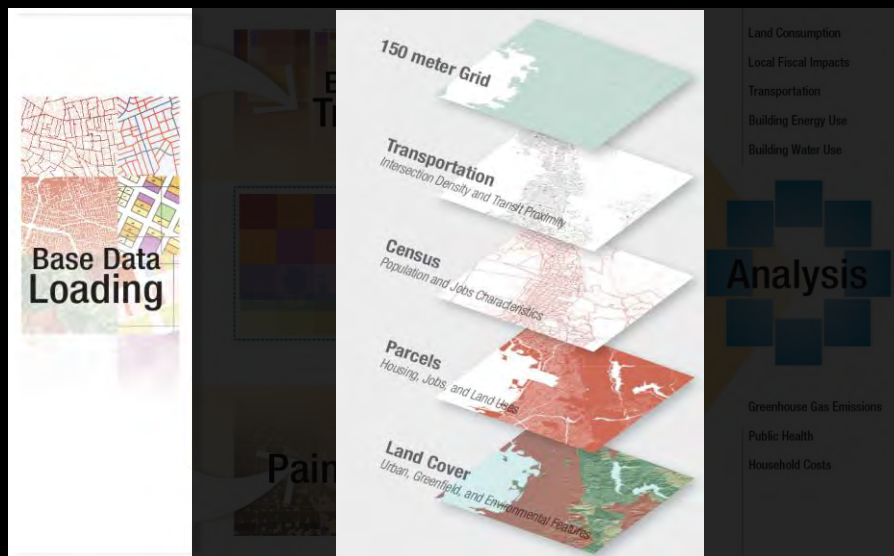
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UrbanFootprint Model Components



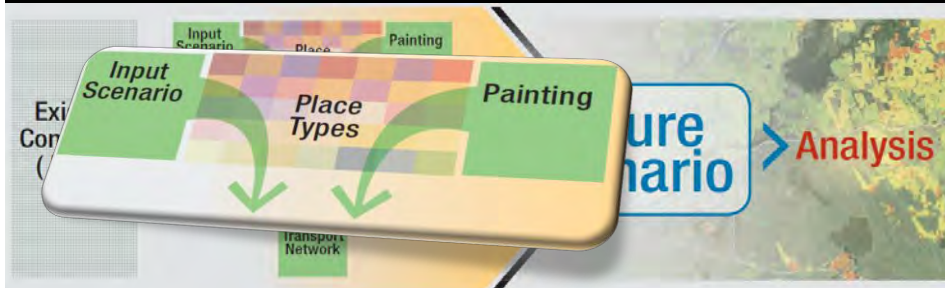
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Base Data



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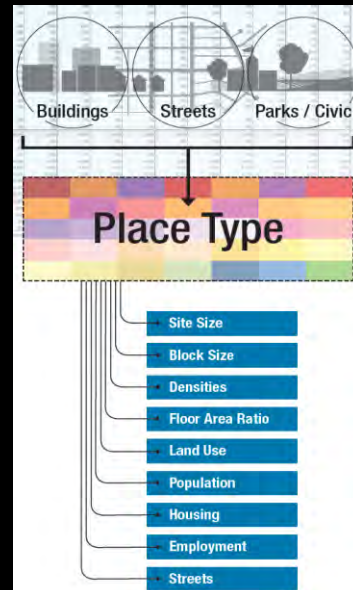
From Base to Future....



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Place Types



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Place Types

Mixed Use Centers and Corridors	1	Urban Mixed Use	
	2	Urban Residential	
	3	Urban Commercial	
	4	City Mixed Use	
	5	City Residential	
	6	City Commercial	
	7	Town Mixed Use	
	8	Town Residential	
	9	Town Commercial	
	10	Village Mixed Use	
	11	Village Residential	
	12	Village Commercial	
	13	Neighborhood Residential	
	14	Neighborhood Low	
Employment Areas	15	Office Focus	
	16	Mixed Office and R&D	
	17	Office / Industrial	
	18	Industrial Focus	
	19	Low-Density Employment Park	
Suburban	20	High Intensity Activity Center	
	21	Mid Intensity Activity Center	
	22	Low Intensity Retail Centered Neighborhood	
	23	Retail: Strip Mall / Big Box	
	24	Industrial / Office / Residential Mixed High	
Suburban Residential	25	Industrial / Office / Residential Mixed Low	
	26	Suburban Multifamily	
	27	Suburban Mixed Residential	
	28	Residential Subdivision	
	29	Large Lot Residential Area	
Rural	30	Rural Residential	
	31	Rural Ranchettes	
	32	Rural Employment	
Institutional	33	Campus / University	
	34	Institutional	
	35	Parks and Open Space	

Scenario Building Blocks



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Building Types



Weighted average of
building attributes:

- Height
- Floors
- Floor Area Ratio
- Retail Area
- Office Area
- Industrial Area
- Residential Area
- Dwelling Units
- Unit Size (Avg.)
- Parking Spaces
- Permeable ft²
- Irrigated ft²



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Building Types

Mixed Use

Skyscraper Mixed Use
High-Rise Mixed Use
Mid-Rise Mixed Use
Low-Rise Mixed Use
Parking Structure/Mixed Use
Main Street Commercial/Mixed Use High (3-5 Floors)
Main Street Commercial/Mixed Use Low (1-2 Floors)

Residential

Skyscraper Residential
High-Rise Residential
Urban Mid-Rise Residential
Urban Podium Multi-Family
Standard Podium Multi-Family
Suburban Multifamily Apt/Condo
Urban Townhome/Live-Work
Standard Townhome
Garden Apartment

Residential (Con't)

Very Small Lot 3000
Small Lot 4000
Medium Lot 5500
Large Lot 7500
Estate Lot
Rural Residential
Rural Ranchette

Commercial/Industrial

Skyscraper Office
High-Rise Office
Mid-Rise Office
Low-Rise Office
Main Street Commercial (Retail + Office/Medical)
Parking Structure + Ground Floor Retail
Parking Structure
Office Park High
Office Park Low



Mixed to create Place Types...

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URBAN DESIGNERS PLANNERS ARCHITECTS

Building Types

Commercial/Industrial (con't)

Industrial High
Industrial Low
Warehouse High
Warehouse Low
Hotel High
Hotel Low
Regional Mall
Medium Intensity Strip Commercial
Low Intensity Strip Commercial
Rural Employment

Institutional

Campus/College High
Campus/College Low
Hospital/Civic/Other Institutional

Civic

Urban Elementary School
Non-Urban Elementary School

Civic (con't)

Urban Middle School
Non-Urban Middle School
Urban High School
Non-Urban High School
Urban City Hall
Urban Public Library
Urban Courthouse
Urban Convention Center
Suburban Civic Complex
Town Civic Complex
Town/Branch Library
Church

Other

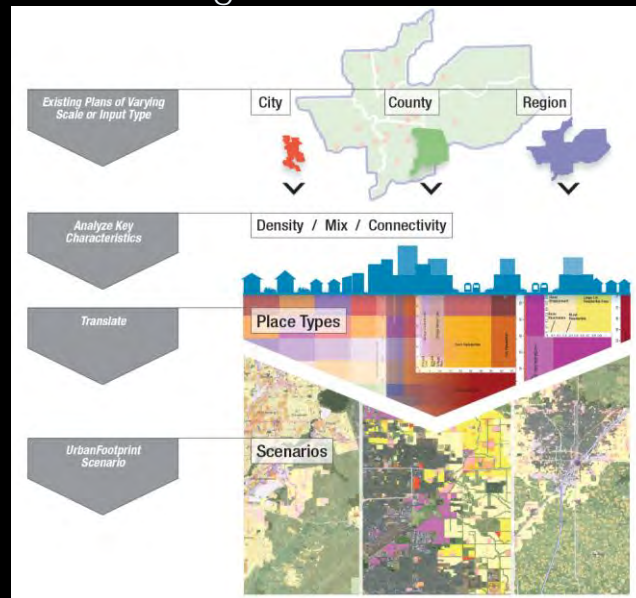
Military/General Catch-All
Low Density Commercial



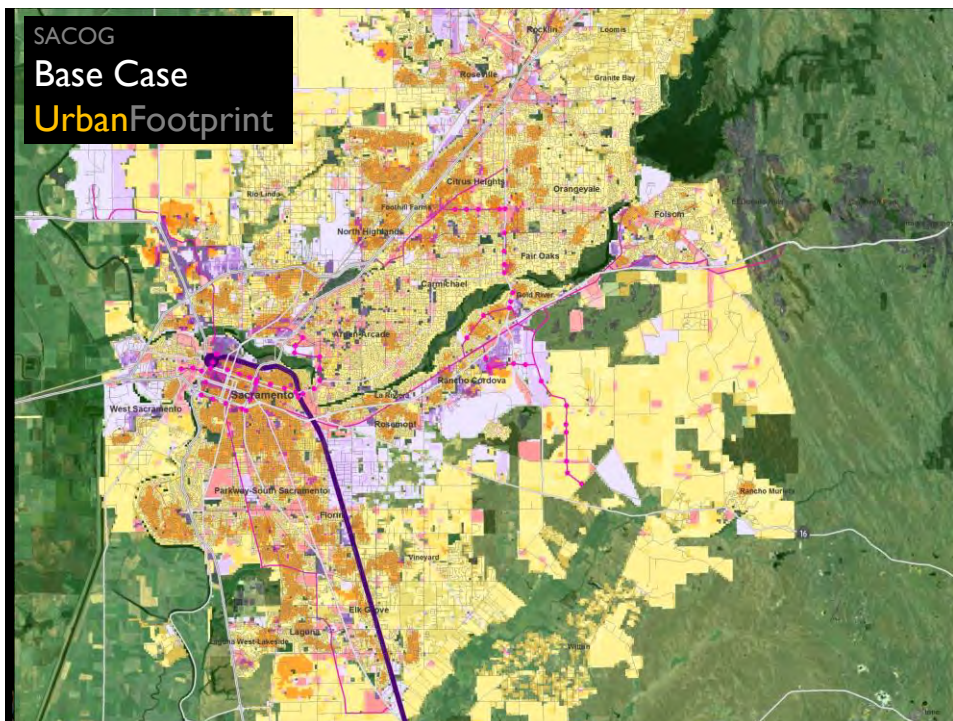
...and for base land
use crosswalks

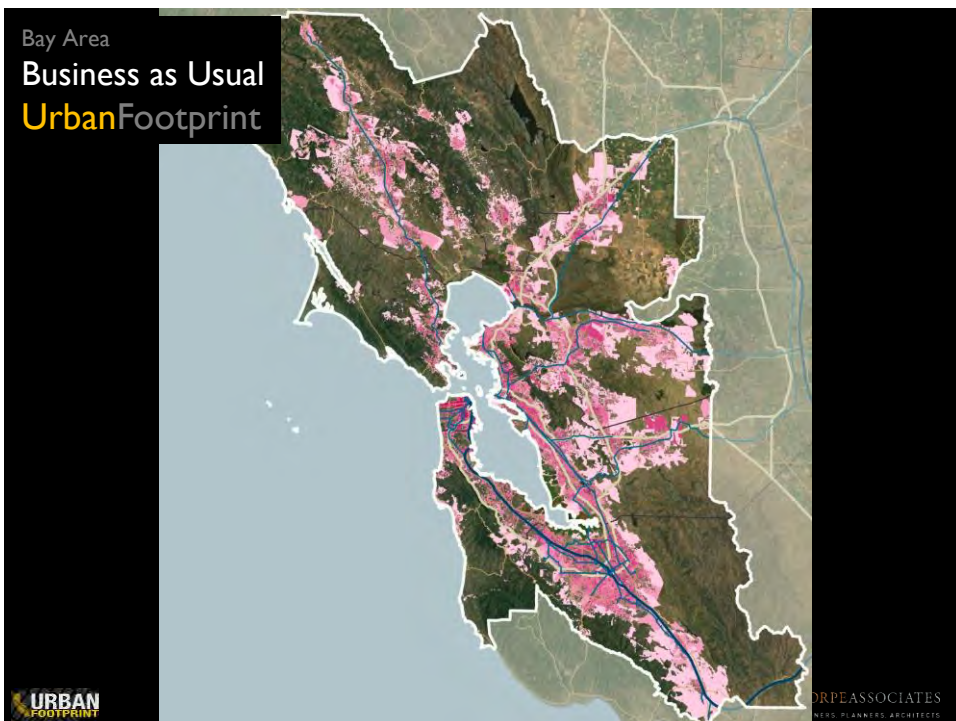
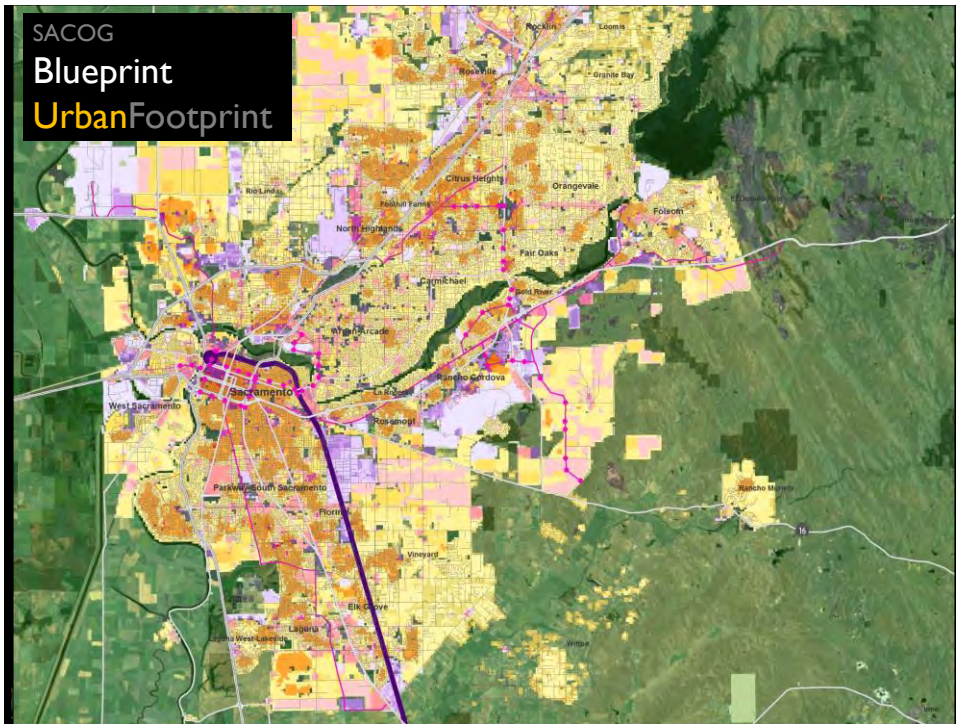
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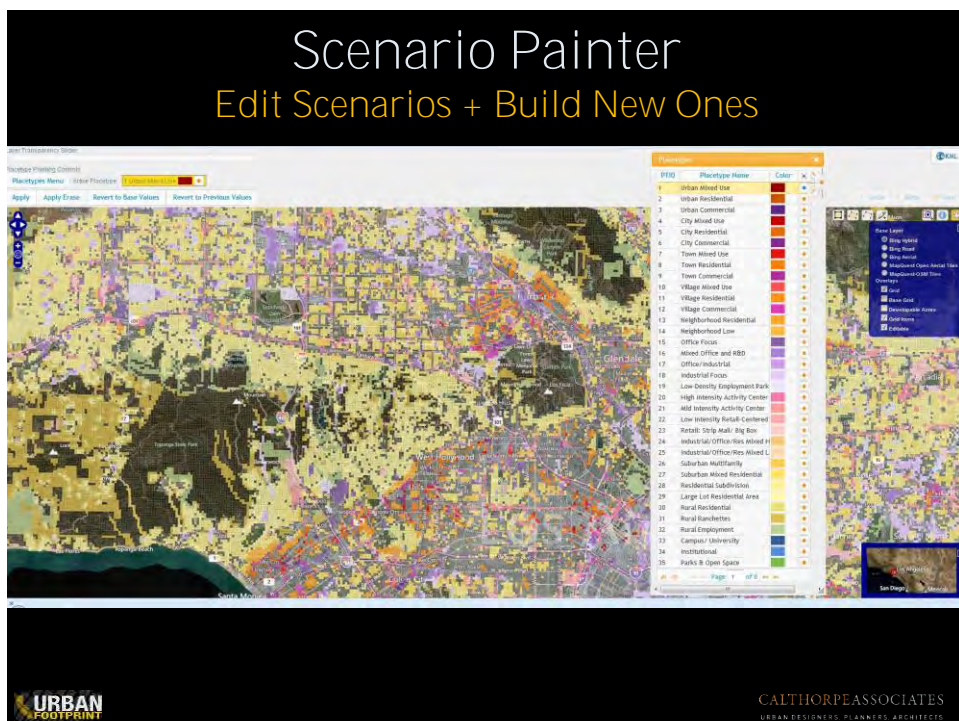
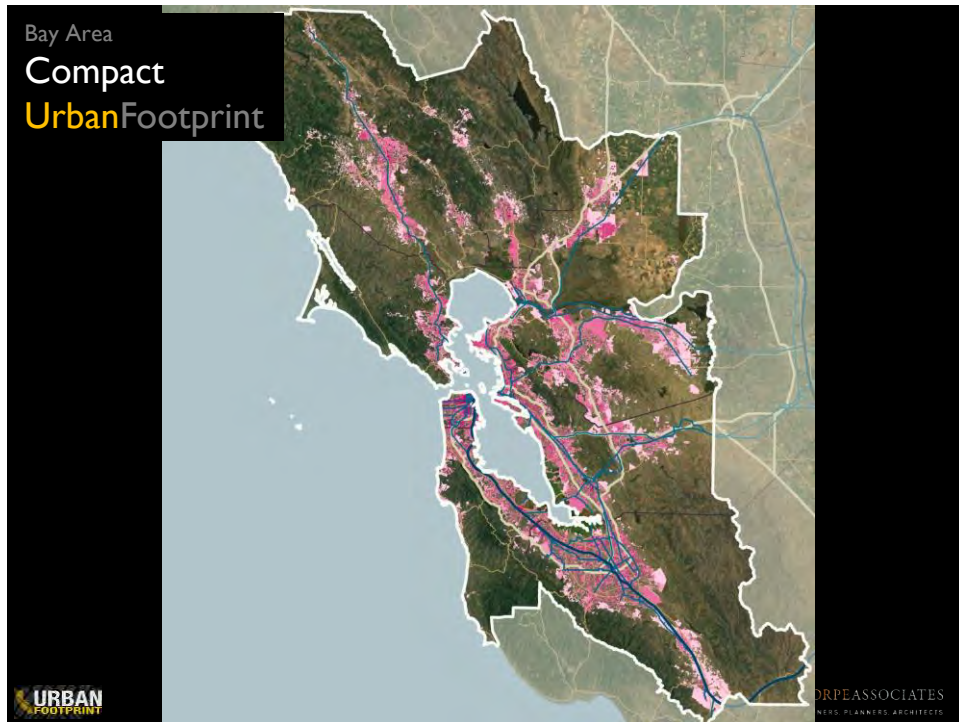
Existing Plan Translation



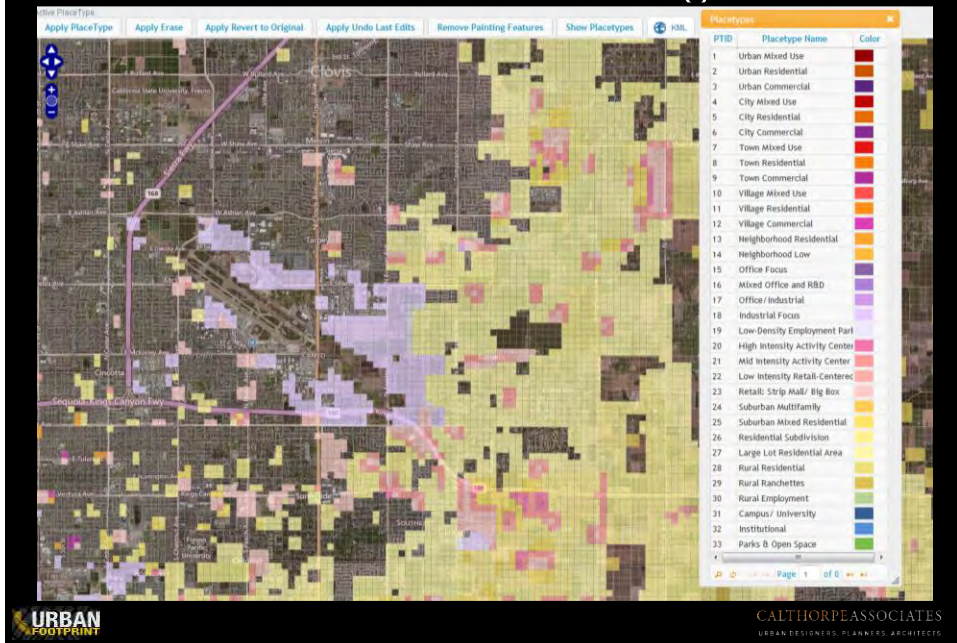
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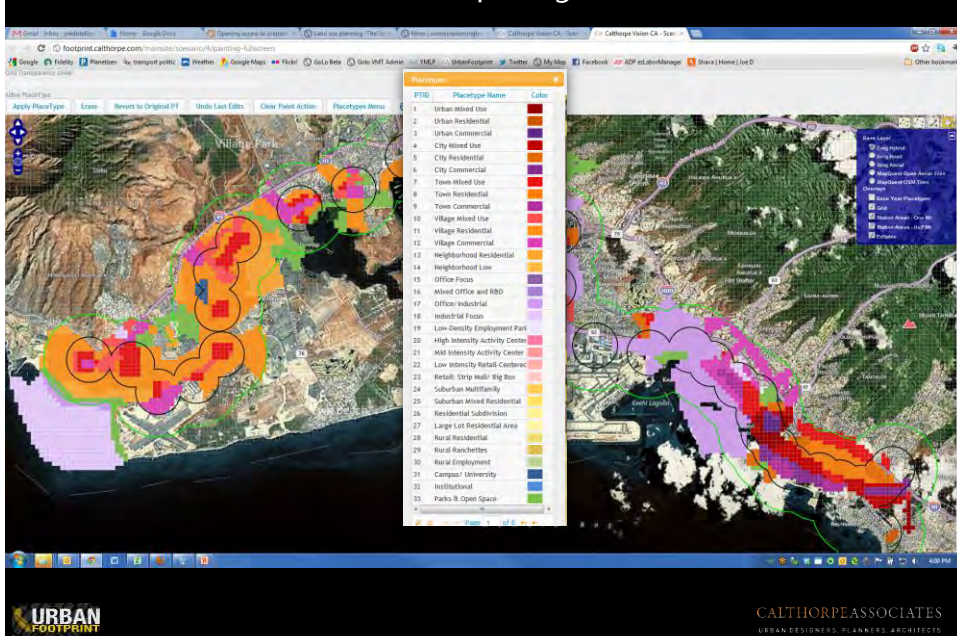




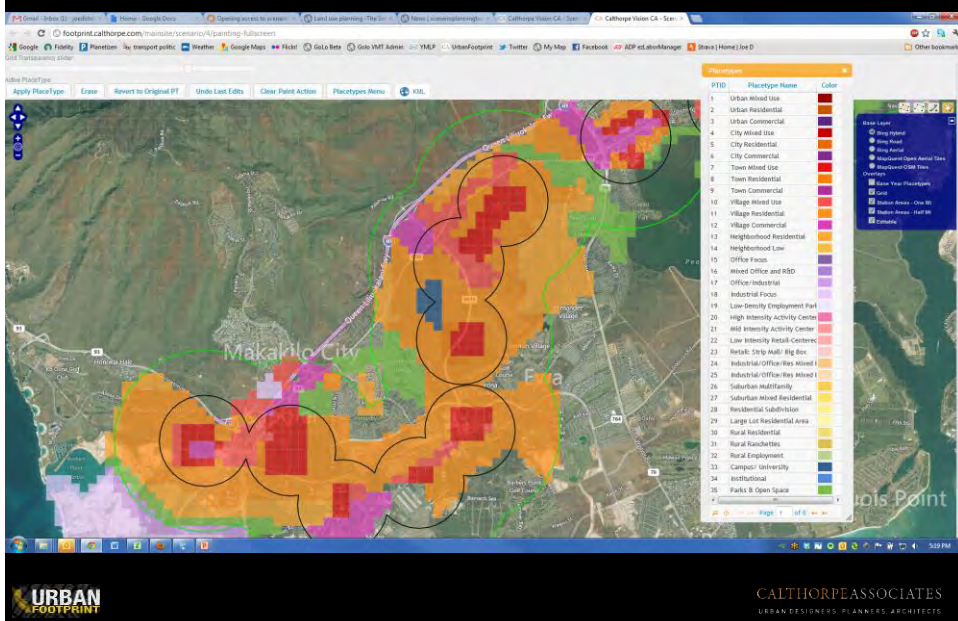
Scenario Painting



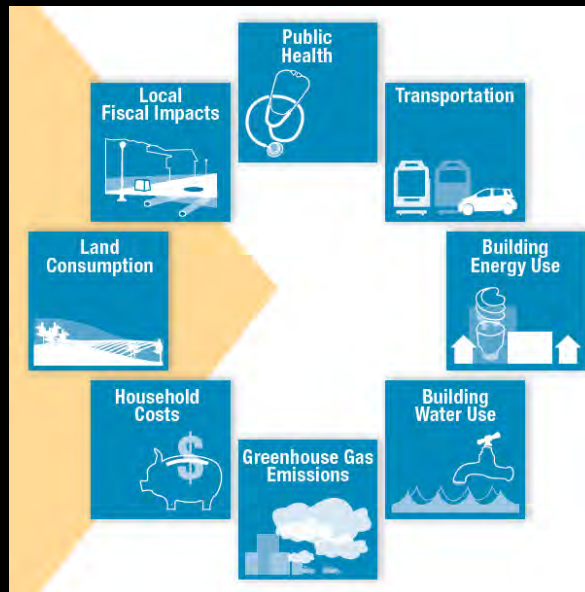
Oahu Deployment



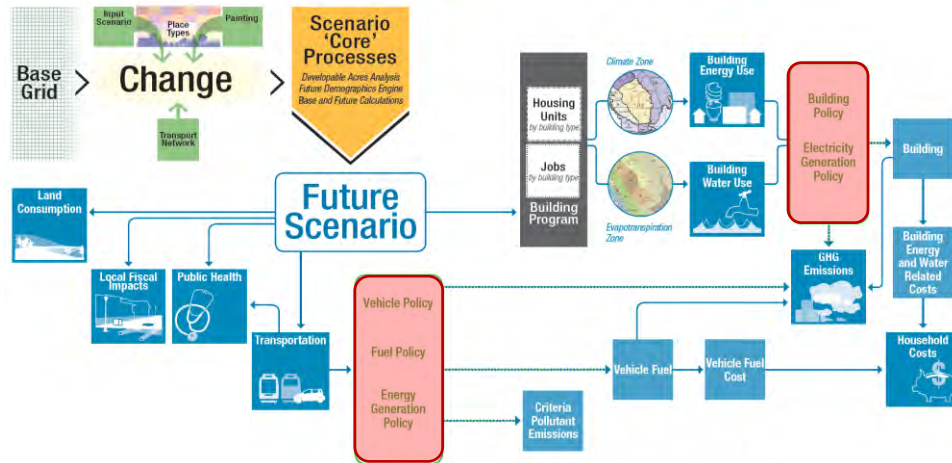
Oahu Deployment



UrbanFootprint Analysis Engines

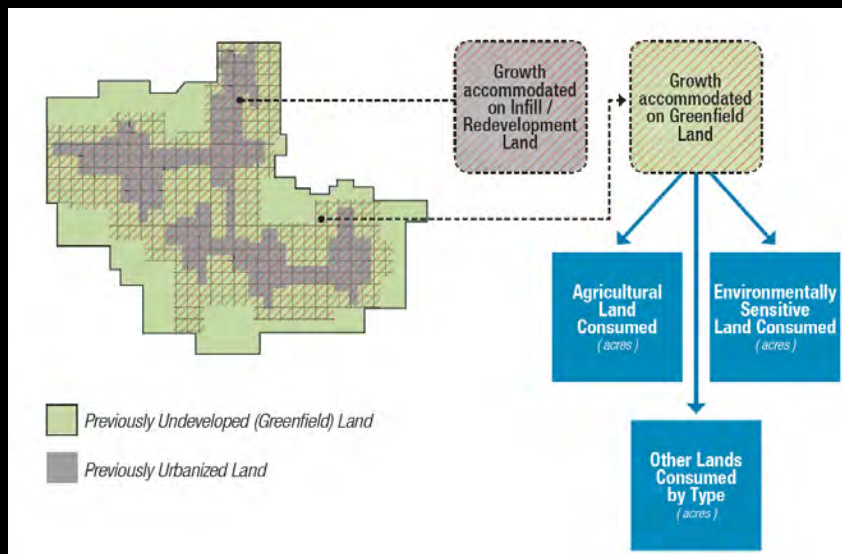


UrbanFootprint Analysis Engines



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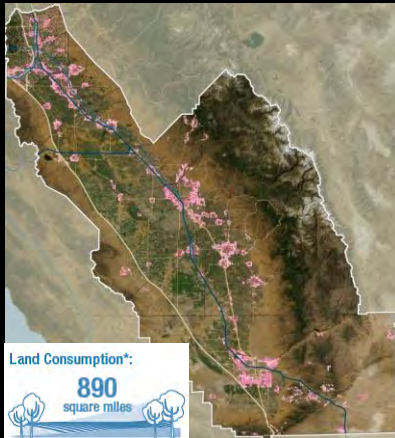
Land Consumption



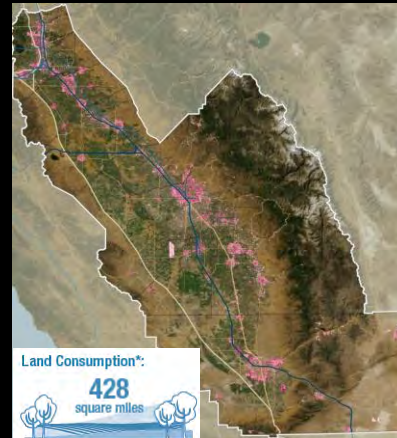
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SJV Land Consumption

Business As Usual



Compact Future



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FOOTPRINT

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SCAG Land Consumption

Business As Usual



Compact Future



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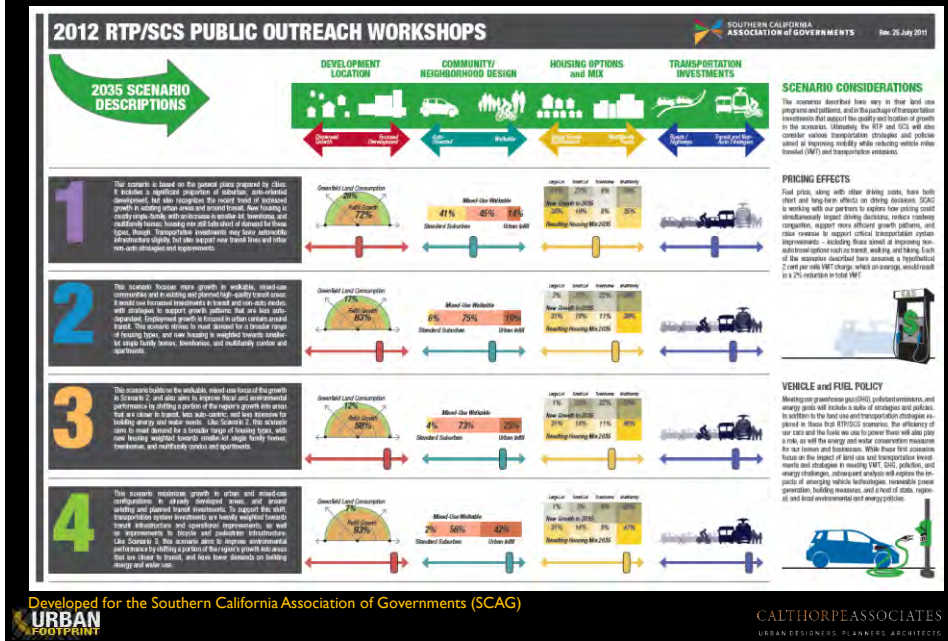
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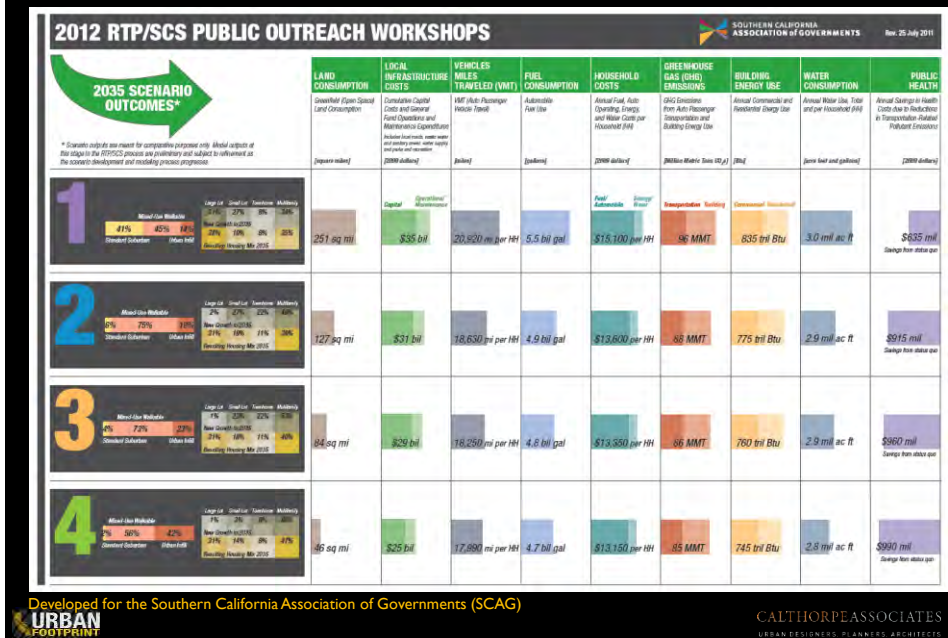
Protects More Than 7,000 Acres of Farmland



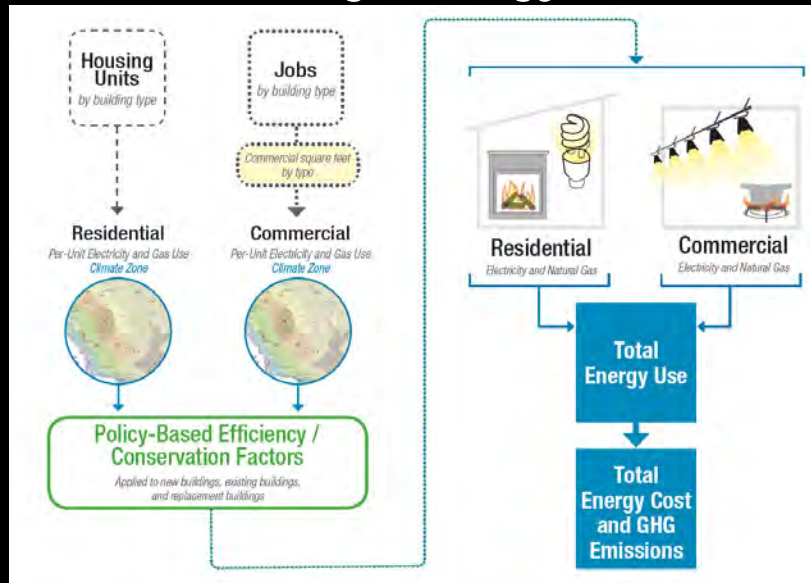
Southern California RapidFire



Southern California RapidFire



Building Energy Use



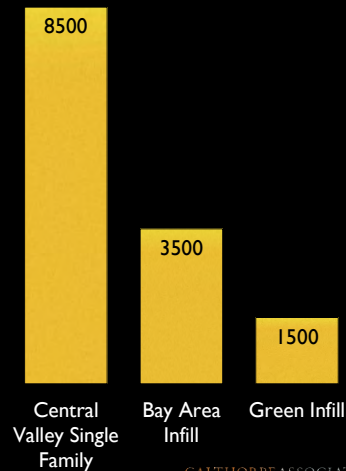
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Climate Zone

Annual Home Energy Use
per Household (KWh)

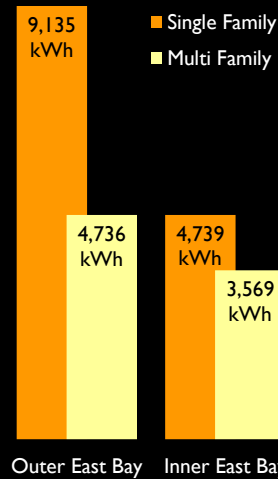


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Electricity Use



Electricity Use per Household (KWh/year)

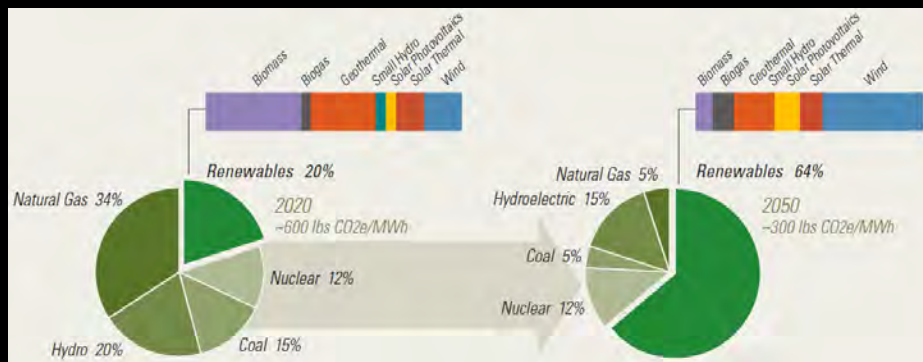


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Energy GHG Emissions Policy Options

Electricity generation portfolio →
GHG emissions rate



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AI v CI

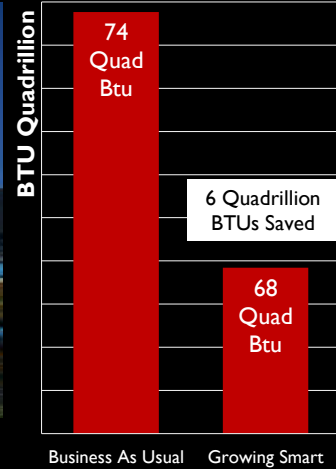
Building Energy

Cumulative to 2050

Would Power ALL Homes in California for 8 Years



Flickr: arbyreed



Business As Usual Growing Smart

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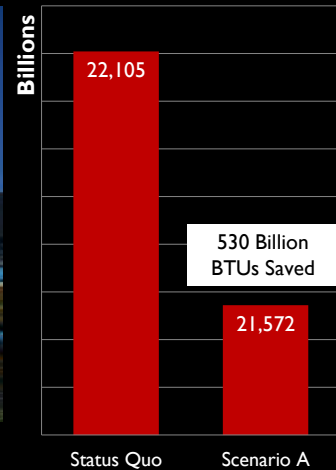
Building Energy

Annual in 2035

Annual Savings Could Power 10,000 Fresno Homes

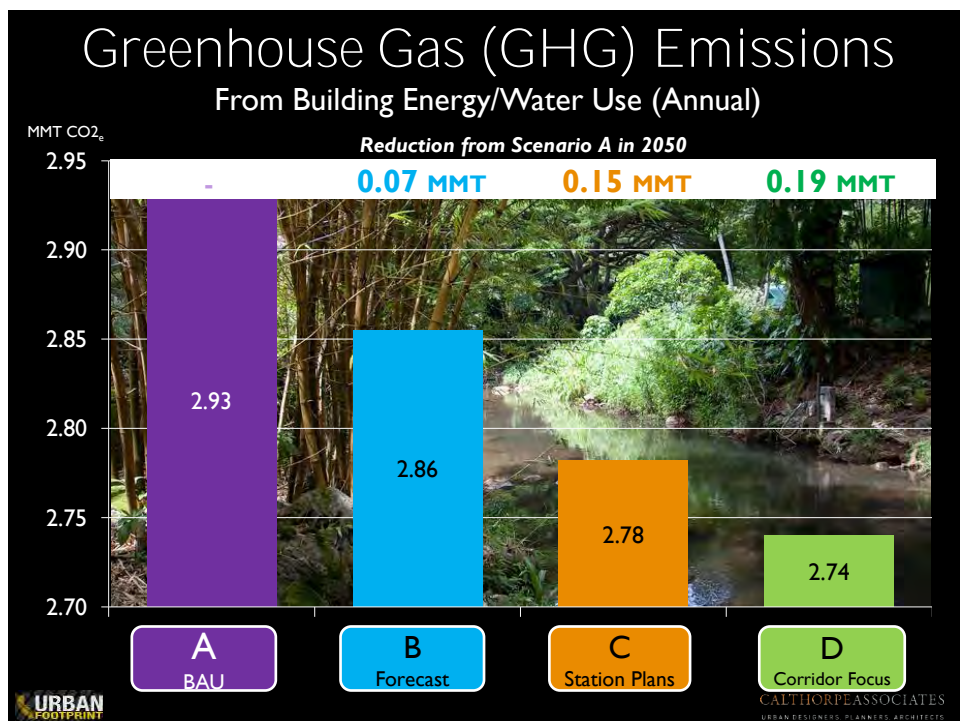
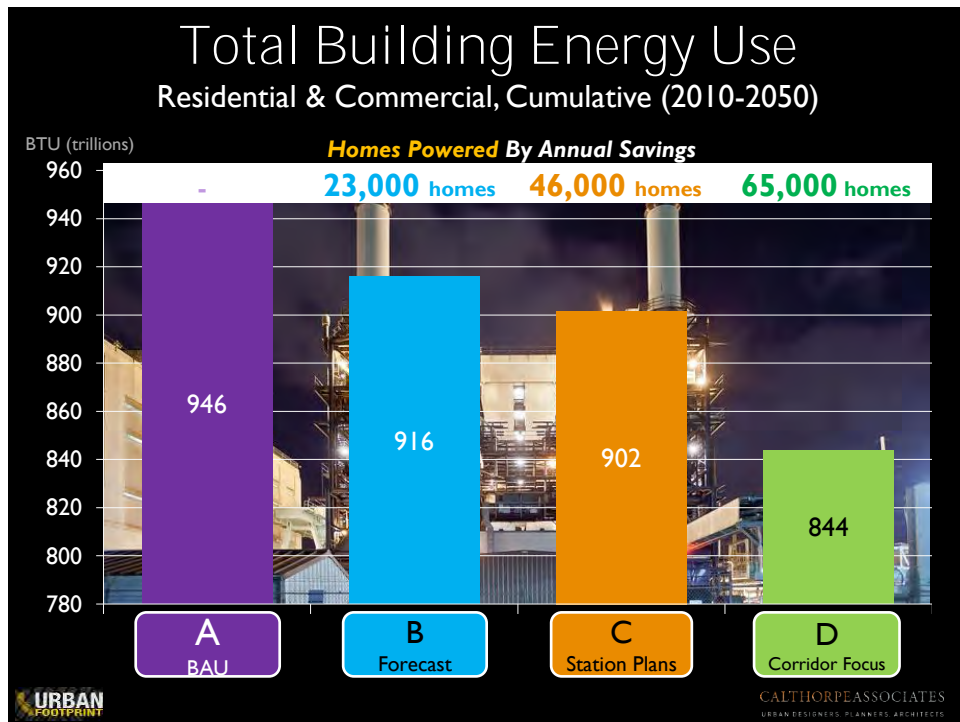


Flickr: arbyreed

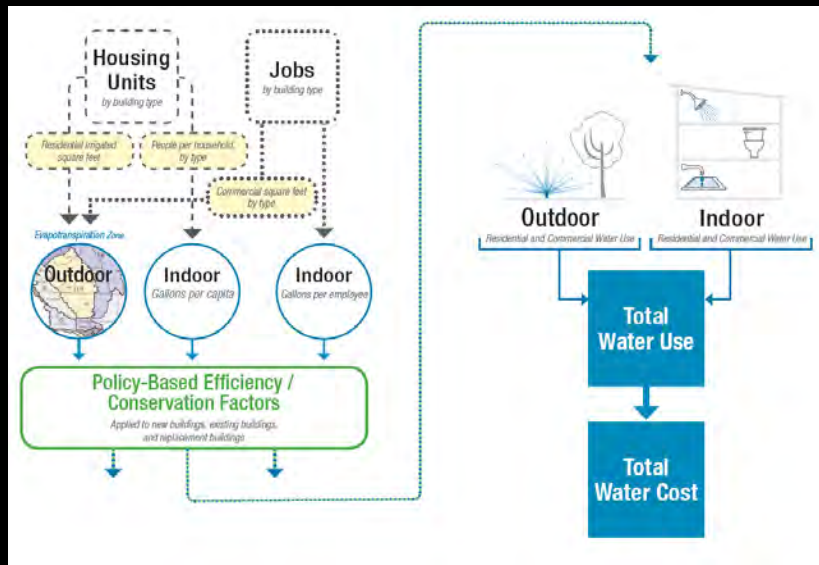


Status Quo Scenario A

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Building Water Use



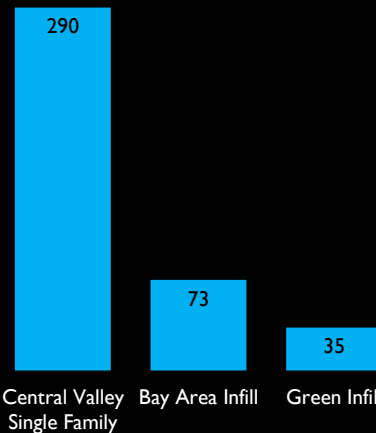
URBAN
FOOTPRINT

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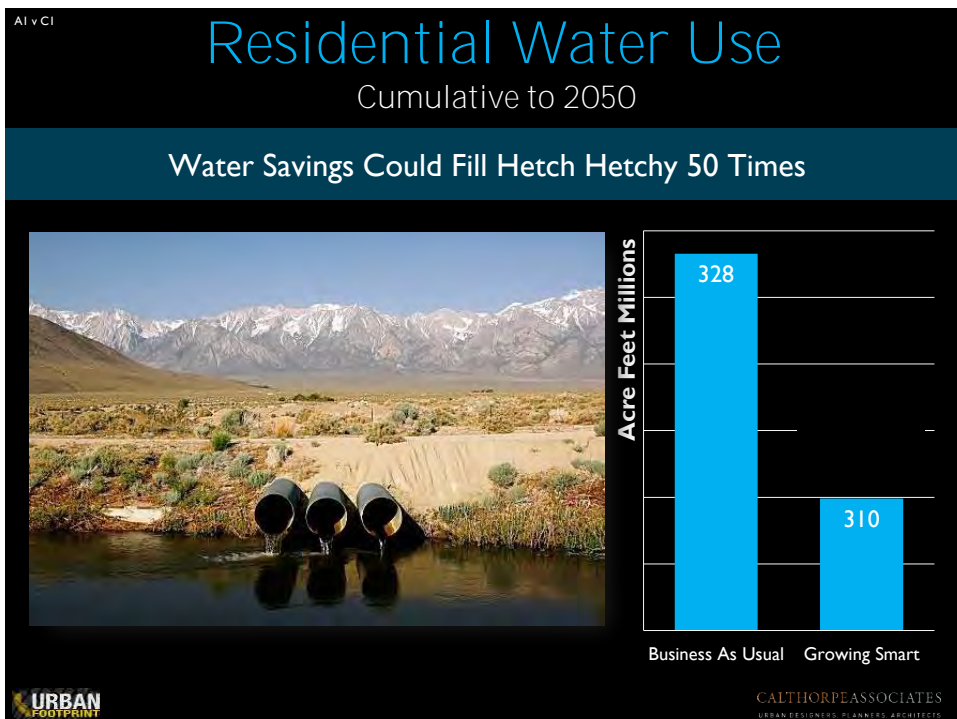
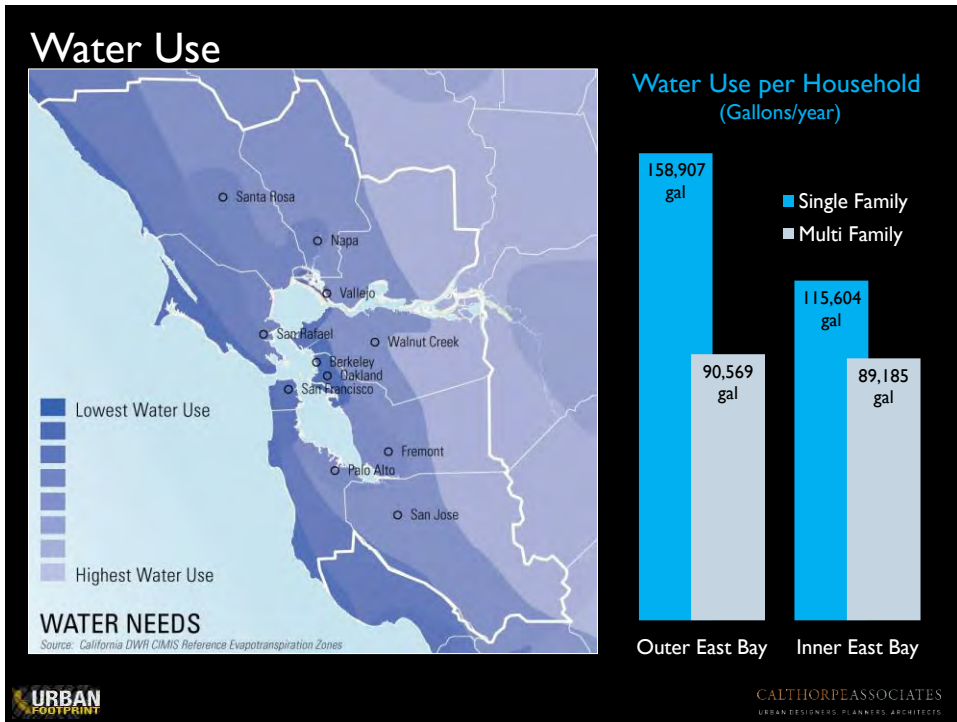


Climate Zone

Annual Water Use
per Household (1000s Gallons)



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Water-Related Energy Use Factors

Table ES-1. Recommended revised water-energy proxies

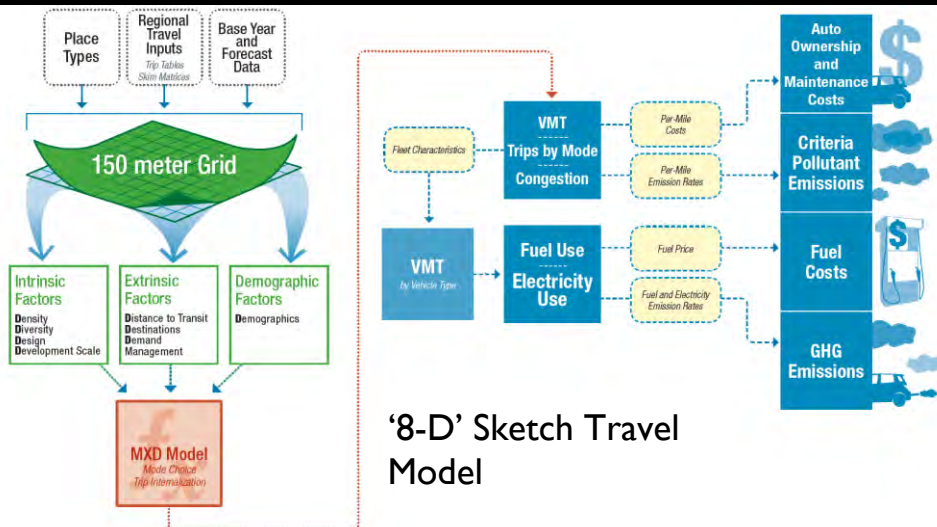
	Indoor Uses		Outdoor Uses	
	Northern California kWh/MG	Southern California kWh/MG	Northern California kWh/MG	Southern California kWh/MG
Water Supply and Conveyance	2,117	9,727	2,117	9,727
Water Treatment	111	111	111	111
Water Distribution	1,272	1,272	1,272	1,272
Wastewater Treatment	1,911	1,911	0	0
Regional Total	5,411	13,022	3,500	11,111

CEC: Refining Estimates of Water-related Energy Use In California. (CEC/Navigant Consulting, Dec 2006)



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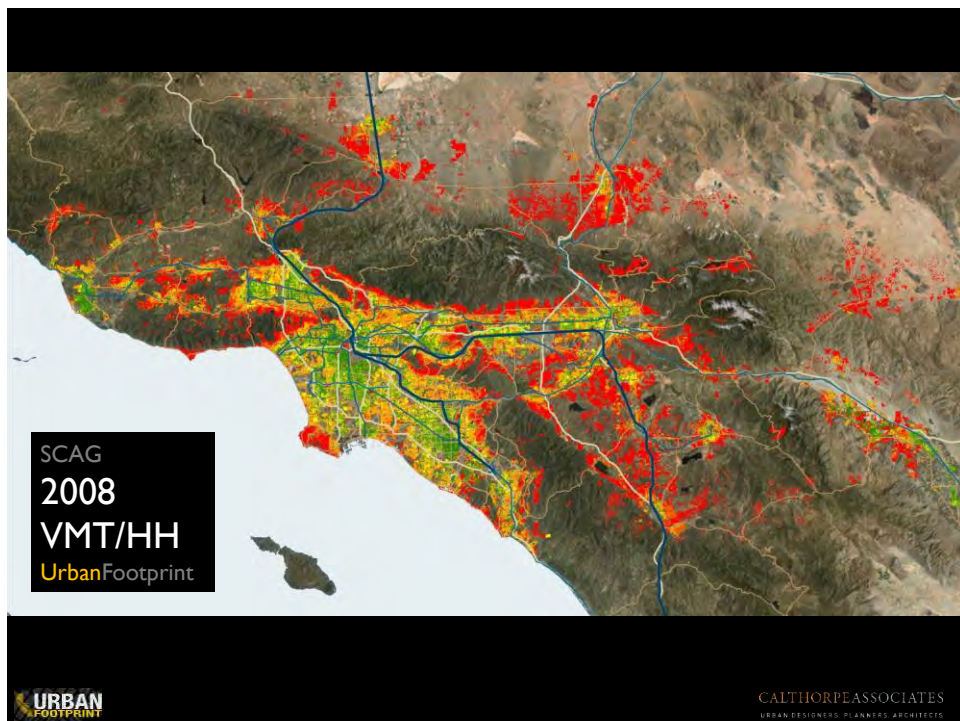
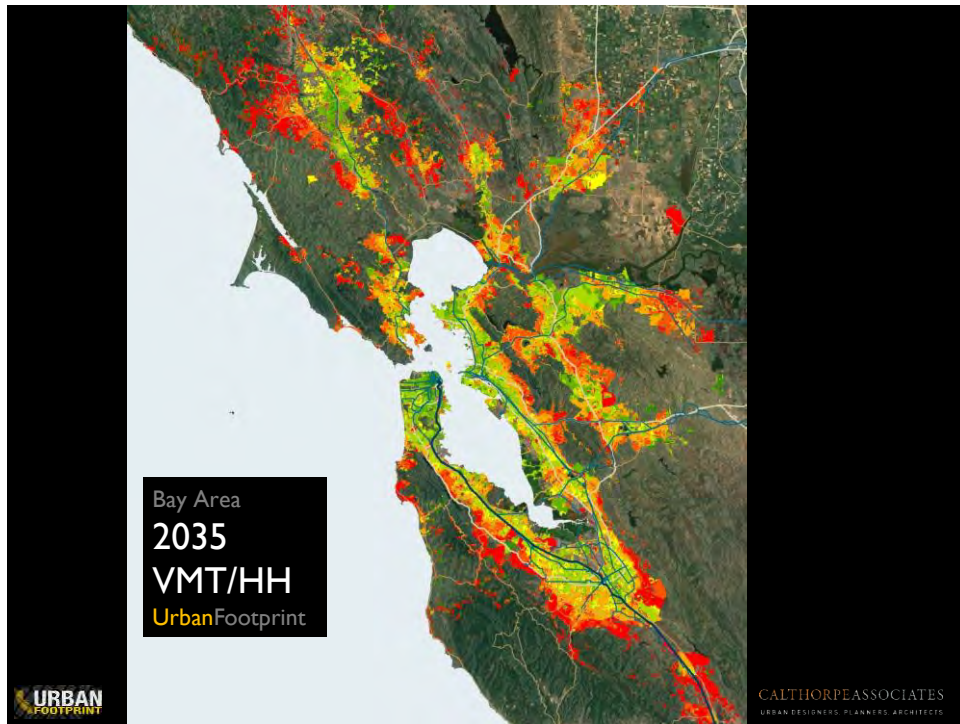
Transportation



'8-D' Sketch Travel Model



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Travel Model Verification

UrbanFootprint

Base-Year Vehicle Miles Traveled (VMT) Validation Chart

Region	Base Year Validation Daily VMT	UrbanFootprint Modeled Base Year Daily VMT
Sacramento Area (6 Counties, SACOG)	50,040,540 <small>(Fehr & Peers, SACOG - SACMET model, 2008 MTP)</small>	53,632,530
San Francisco Bay Area (9 counties, ABAG/MTA)	143,681,890 <small>(Fehr & Peers, MTC - MTC model, 2009 RTP)</small>	143,784,640
Southern California (6 Counties, SCAG)	378,105,370 <small>(Fehr & Peers, SCAG - SCAG model, 2008 RTP)</small>	378,117,580
San Diego (SANDAG)	80,584,670 <small>(Fehr & Peers, SANDAG - SANDAG model, 2011 RTP/SCS)</small>	82,432,940
San Joaquin Valley (8 Counties)	114,532,890 <small>(Fehr & Peers, UC Davis - CSTDM 2009 Model)</small>	111,197,210



FEHR & PEERS

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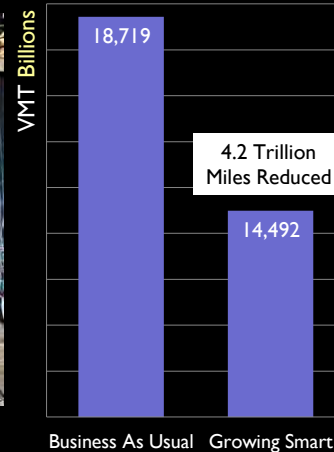
AI v CII/C2

Vehicle Miles Traveled (VMT) Cumulative to 2050

Equivalent to taking ALL cars off California's roads for 15 years



Flickr: trash-photography



AI v CI

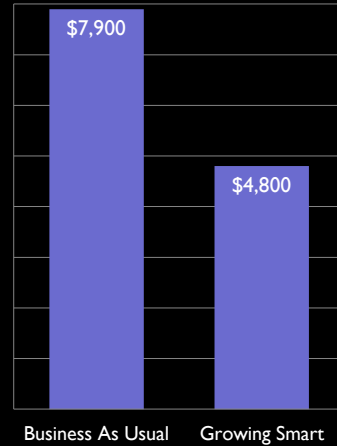
Auto Fuel Cost

Cost Per Household in 2050

\$3,100 Annual Savings Per Household in 2050



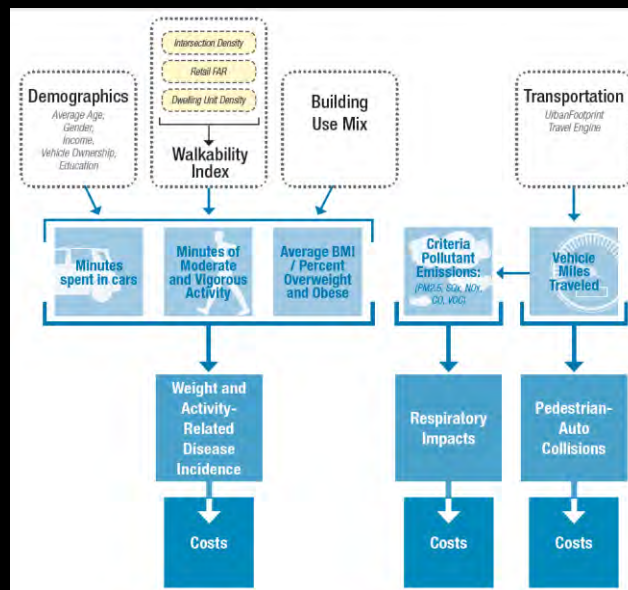
Flickr: TheTruthAbout...



Business As Usual

Growing Smart

Public Health



Activity-Related Health Indicators

SANDAG
2035
MVA/Person
UrbanFootprint

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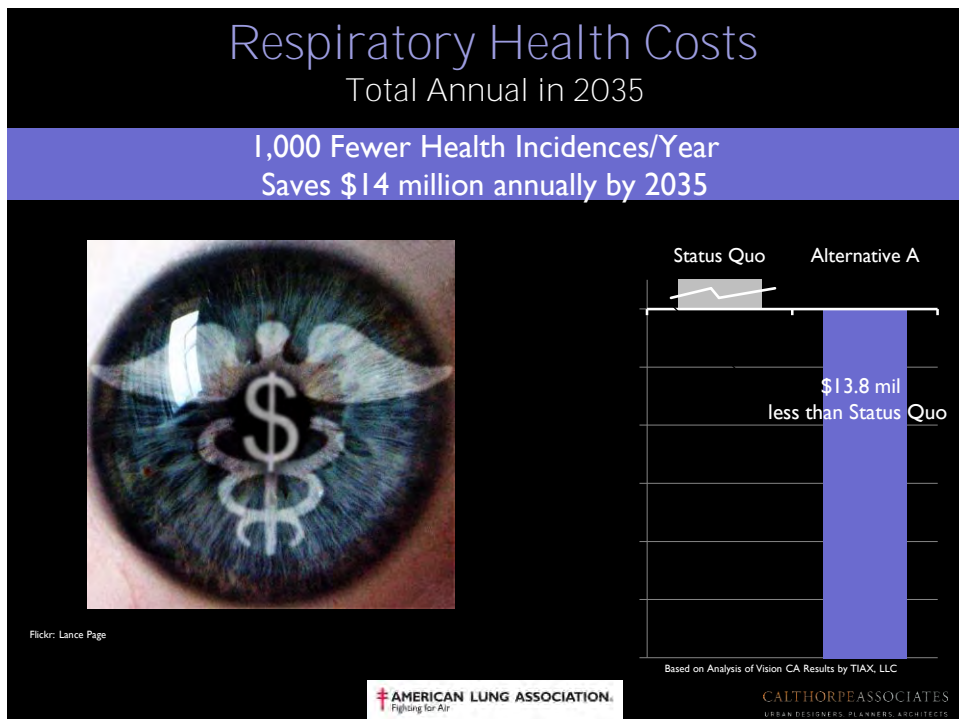
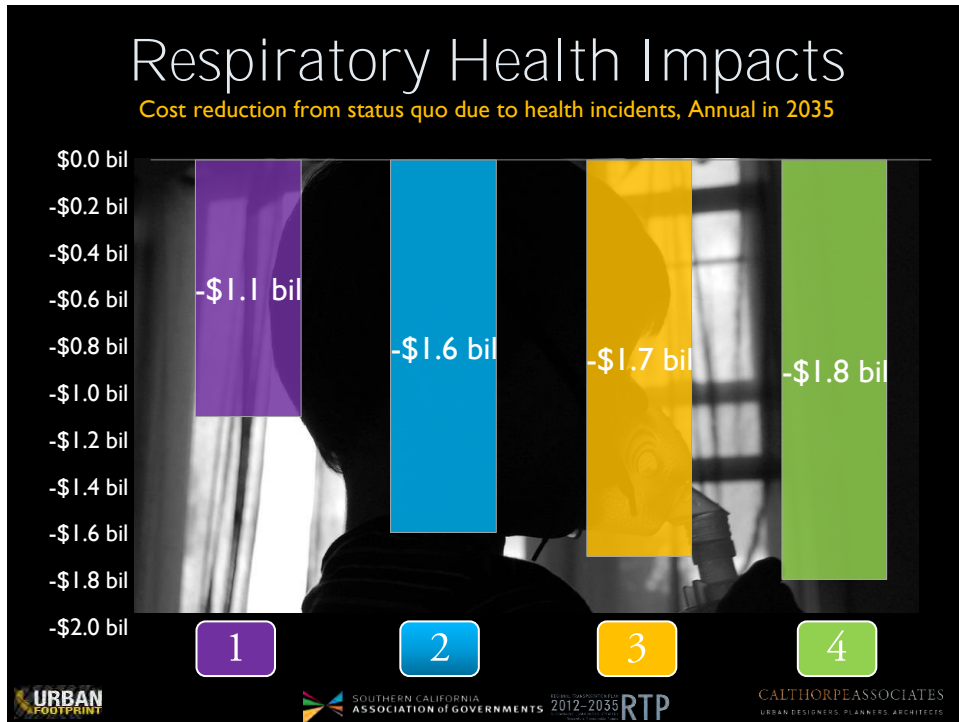
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Activity-Related Health Indicators

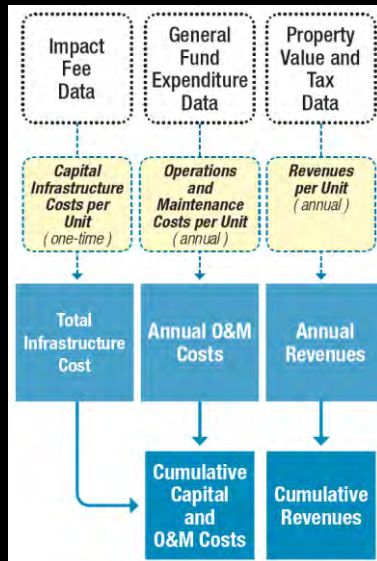
SCAG
2035
MVA/Person
UrbanFootprint

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Local Fiscal Impacts



Next Steps

- Regional Assumptions Research
- IMPACS Model Integration



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Local Infrastructure Costs

Capital & Operations & Maintenance Costs for New Growth, 2008-2035

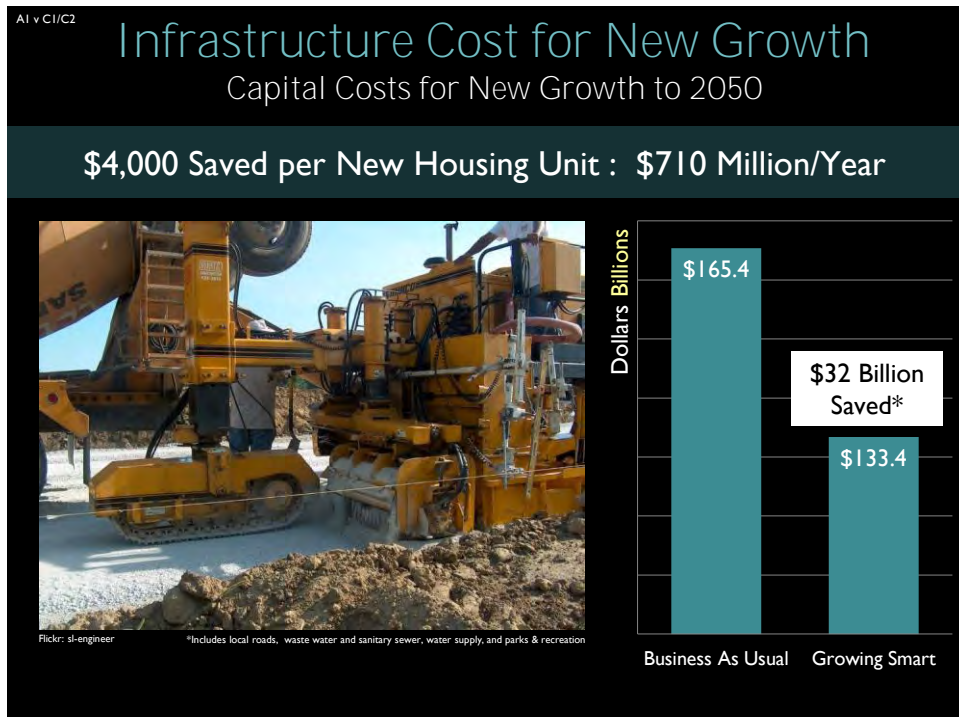
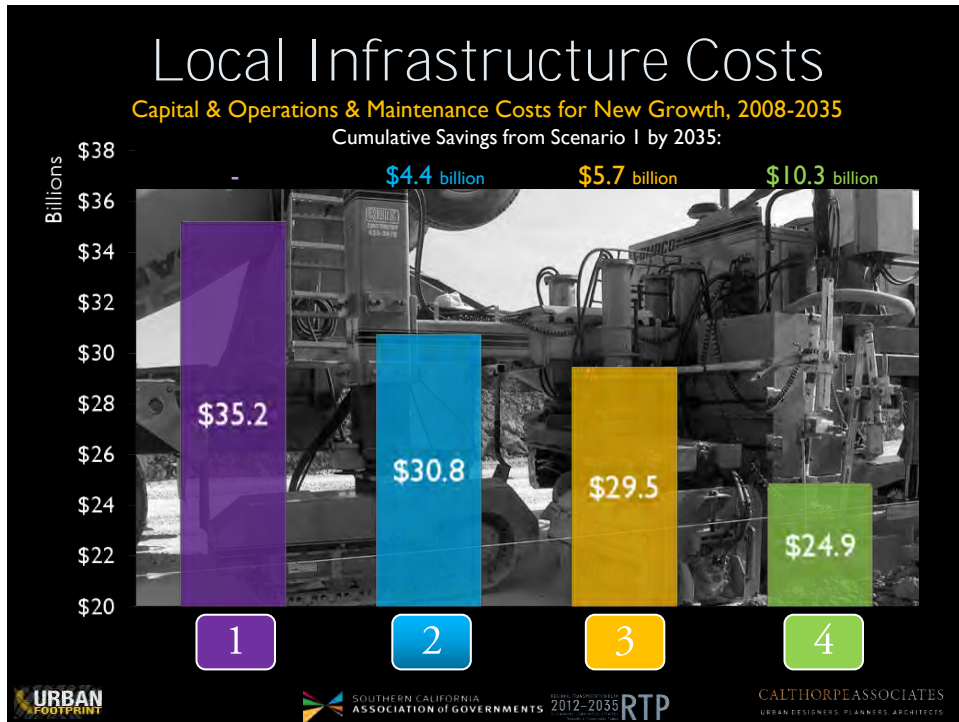


Includes capital costs and general fund O&M expenditures for local roads, wastewater and sanitary sewer, water supply, and parks & recreation



SOUTHERN CALIFORNIA
ASSOCIATION OF GOVERNMENTS 2012-2035 RTP

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AI v CII/C2

O&M Costs for New Growth

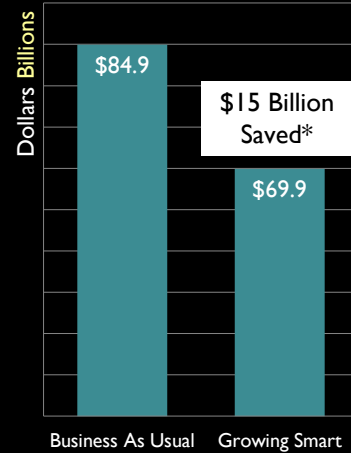
Engineering & Public Works Costs for New Growth to 2050

\$15 Billion Saved : \$334 Million Per Year



Flickr: watchlooksee

*Includes City General Fund engineering and public works functions



Infrastructure Cost for New Growth

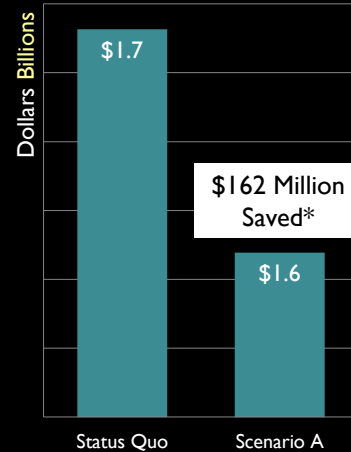
Capital & Operations (O&M) Costs for New Growth to 2035

\$2,000 Saved per New Housing Unit : \$6.5 Million/Year



Flickr: si-engineer

*Includes local roads, waste water and sanitary sewer, water supply, and parks & recreation



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AI v CI

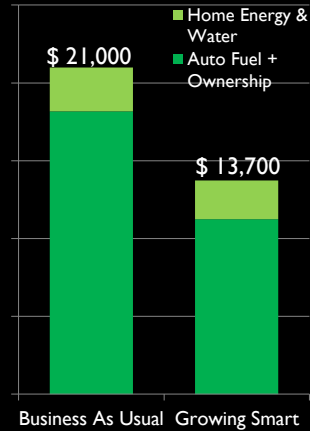
Annual Household Costs

Per Household Annual in 2050

\$7,300 Savings Per Household in 2050



Flickr: Diablo_Solar

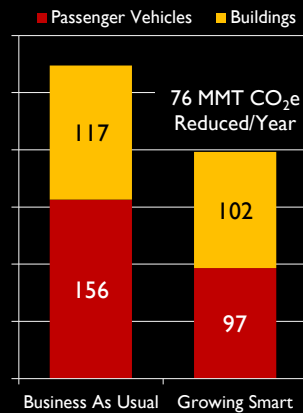


AI v CI

Greenhouse Gas Emissions

Annual in 2050

Emissions offset by 47,000 square miles of trees in a year.
A forest covering 1/4 of California.

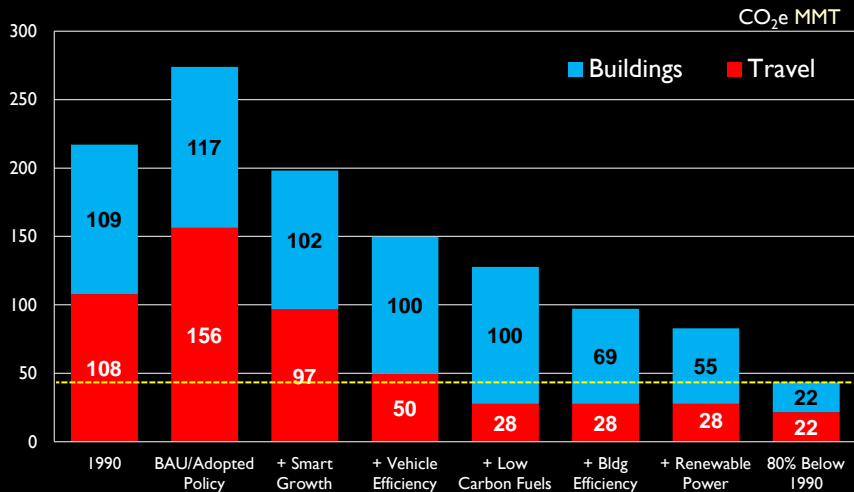


URBAN
FOOTPRINT

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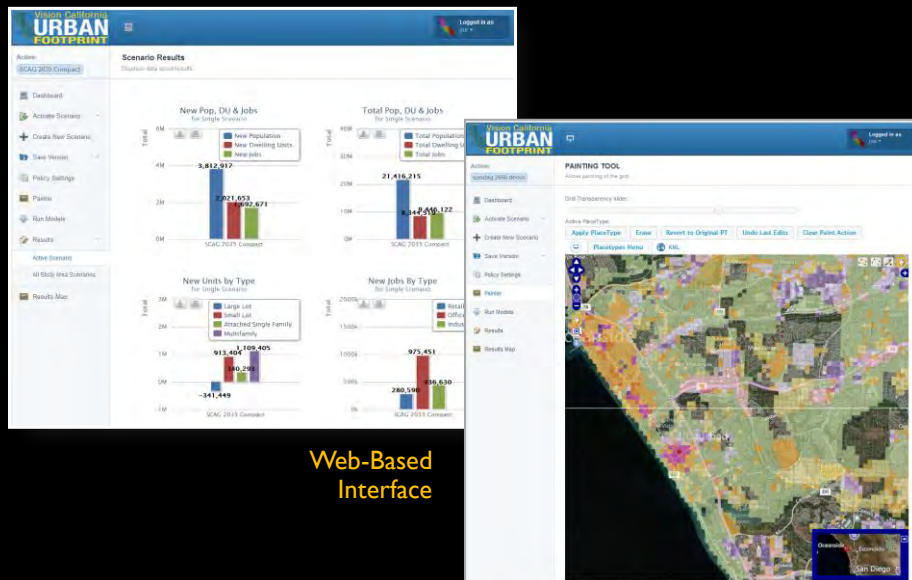
California 2050 GHG Emissions

Getting to 80% Below 1990



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Version 1.0 User Interface



Web-Based
Interface



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For More Information
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